




Chapter 1 Circulation and Immunity



When was the last time you spent a hot summer's day on the water with your friends? Although kayaking requires some specialized equipment, tubing is wonderfully low tech—all you need is an inner tube and the right setting. Tubing down a river can be especially fun. Some businesses take advantage of places where a river naturally makes a C-shaped turn—this allows both the entry point and the exit point to be close together. In this way when a passenger reaches the exit point, it's a short walk uphill to start all over again. Places that rent inner tubes often employ lifeguards to make sure that the riders are safe. These businesses also employ security personnel to ensure that only paying customers use the facility's inner tubes. There is also a maintenance staff to replace worn-out tubes. Through local patterns of evaporation and precipitation, the water cycle provides the water pump for the river system.

The function and parts of the human circulatory system are comparable to tubing down the river. The circulatory system has a muscular pump that cycles blood. Some blood cells are shaped like the tubes so they can easily move through the bloodstream, but these cells transport dissolved gases instead of human riders. Like blood vessels, the river's banks direct the flow of fluid. Human blood has cells that act like the security guards, the lifeguards, and even the maintenance crews.



Try This Activity

Measuring Your Heart Rate Before and After Exercise

Your heart rate provides valuable information about your health. Immediately after exercising, athletes often compare their heart rate to their resting heart rate. This procedure monitors their level of fitness and the intensity of their training program.

Purpose

You will measure your heart rate in three different situations: when you are resting; immediately after you have finished exercising; and at two-minute intervals after exercising.

Procedure

Using a watch or clock, count the number of beats in fifteen seconds and then multiply by four to get the beats per minute. It is best to measure your pulse two or three times and calculate an average to get the most accurate heart rate while you are resting. Record this number as your resting heartbeat in beats per minute (bpm).

step 1: Make sure you are seated and rested before beginning this activity. Locate your pulse or the pulse of a partner by using both your index finger and your middle finger. The pulse is most easily found by pressing these two fingers against the inside of your wrist or against the carotid artery, which runs up your neck on either side of your throat. Each beat of your pulse corresponds to a beat of your heart. Using your thumb may interfere with counting since the thumb contains its own pulsing artery.

step 2: Most members of your class will engage in four minutes of the **same** physical activity at a moderate level. Physical activities to choose from include jumping jacks, running on the spot, or, while seated, repeatedly lifting two textbooks from your shoulder to above your head. At the instant the activity ends, take your pulse. In beats per minute, record your pulse immediately after exercising.

step 3: Continue recording your pulse rate every minute for the next five minutes or until your pulse returns to its resting rate.

step 4: Record your average values for both your resting heart rate and your recovery time. Share this information with your teacher so that you and your classmates can calculate average values for your class.

Analysis

1. Compare your resting heart rate with the class average. Should a difference between heart rates alarm you?
2. List some factors that might contribute to the difference in resting heart rates among class members.
3. Describe how your heart rate changed during exercising, and relate how it was altered after you stopped.
4. How long did it take for your heart rate to return to its resting rate? Compare your time to recover with that of other people.
5. Explain why it is necessary for each class member to perform the same exercise for the same length of time.
6. Include in your health file your resting heart rate, your heart rate during exercise, and your recovery time.



CAUTION!

If you have a medical condition that prevents you from participating in physical education classes, you should not participate in the exercising part of this activity.



As you learn about the circulatory system, immune system, and genetics, you will be collecting information about yourself similar to the information that a doctor might collect about you. Throughout Unit A you will compile this information into a health record for yourself. When you see the health file visual cue, add information to your file. In addition to recording valuable data about yourself, your health file will be a valuable study guide.